MEASURING THE SNOW LAYER IN MAPLE CREEK CANYON, UTAH.

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The third annual snow survey of Maple Creek Canyon has just been completed. It was successful in every way and added much to our knowledge of the storage of snow for irrigation and power purposes. The snow survey this year was conducted along the same lines as those of previous years. The various data which have been considered in making the estimates are: Snow depth, snow density or amount of water that the snow contains, whether snow is packed or loose, whether ground is frozen or otherwise, and whether wet or dry. All of the above factors are very important in making estimates, and experience is necessary to give each one its true weight.

The details of the survey are given below, and it is a summary made up of almost 1,500 soundings made by an alpenstock, and 281 measurements of snow density made by a piece of apparatus specially designed for the purpose.

The measurement of the depth and density of the snow layer over the Maple Creek watershed this spring reveals the fact that there is about 16 per cent more water stored in these hills than at the same time last year. It has also been found that the compactness of the snow is practically the same as it was last year, and that the ground beneath the snow contains no frost, as was the condition last year, so that if weather conditions from March 17, 1913, to the close of the irrigation season average about the same as in 1912 Maple Creek should supply about one-eighth more water this season than it did last year, and from a cursory examination of adjacent watersheds it is quite probable that the conditions in the Maple Creek watershed are an index to conditions in near-by mountains.

The snow at the time of the survey was about 5½ inches deeper than last year, and showed little drifting except in the rougher portions of the watershed; and up to the close of the measurement period there had been only a few small snow slides even in these regions, thus indicating a firm condition of the under layer. The streams were all comparatively low; the main canyon stream was closed by snow above Perry Hollow; Dibble Canyon was closed from a very short distance above the falls, and the stream from Right Hand Fork was small and extended but a few rods from its junction with the main canyon stream.

Practically the entire watershed carried a snow covering of a trace or more, excepting the north side of the main canyon which was generally bare. It was also discovered that a comparatively small acreage, confined to a few slopes, carried so little as a trace, or broken covering, of snow. The density measurements, or determinations of the actual water content of the snow, showed noticeable uniformity throughout the regions measured.

Owing largely to the impracticability of securing measurements of the snow that will be comparable from year to year in the rougher portions of the watershed and on the steeper slopes, no systematic measurements were made this spring in Right Hand Fork, nor in Maple Canyon slide and Service Berry Hollow. It is therefore believed that in the figures herewith presented of the snow layer over the smoother portions of the watershed, we have records that represent very closely a measure of the amount and condition of the snow that will form a basis for fairly accurate comparisons with measurements in other years. The comparisons made in the accompanying table may be considered direct, as the averages and values for identical regions have been computed for this purpose. In comparing the 1913 and 1912 figures with the values obtained in 1911, however, it will not be forgotten that these last named figures were obtained two weeks later in the season.

COMPARATIVE SUMMARIES OF MAPLE CREEK SNOW MEASUREMENTS MADE DURING THE PAST THREE YEARS.

	Year.	Month and date.	Number of measurements.	Average depth of snow.	Average amount of water in the snow, inches.	Percentage of density.
Perry and Squaw Hollows	1911	Mar. 22	18	23.1	7.4	32
	1912	Mar. 5	36	37.2	9.6	26
	1913	Mar. 6	36	41.9	9.9	24
Tuckett Hollow	1911	Mar. 23	27	35.3	11.8	33
	1912	Mar. 6	29	46.2	13.0	28
	1913	Mar. 7	38	48.0	11.6	24
Left Hand Fork and all its south and southwest branches	1911	Mar. 24, 25	76	36.7	10.1	28
	1912	Mar. 8, 9	66	46.8	10.2	22
	1913	Mar. 9, 10	94	51.7	12.8	25
Dibble Fork and its left-hand branch	1911	Mar. 26, 27	65	38.7	13.4	35
	1912	Mar. 8, 9	91	45.6	11.5	25
	1913	Mar. 10, 11, 15, 16.	85	50.8	12.7	25
Main Maple Canyon and Van Leuvan Hollow	1911	Mar. 27	9	27.3	8.3	30
	1912	Mar. 11, 13	44	29.6	6.4	22
	1913	Mar. 12, 13	28	32.9	8.3	25
Summary, entire region	1911	March, last half.	195	35.4	10.8	31
	1912	March, first half.	266	42.2	10.2	24
	1913	.....do	281	47.8	11.8	25

A number of small excavations into the soil beneath the snow were made at various places over the region traversed. The earth was found to be quite moist, even on the steep slopes, with a temperature of about 33° at depths from 4 to 10 inches beneath the soil surface. The temperature of the snow near the soil was 32°.

An interesting fact in this connection is that many of the streams which appear suddenly from beneath the snow in the creek bottoms, where the open streams begin, and those that come from perpetual springs out of the hillsides, have temperatures much higher than the surface soil temperatures observed. The temperature of the water, fresh from the earth, near Perry Hollow at an elevation of about 7,000 feet was 43°, and moss was clinging to the few rocks there, and a few blades of grass were growing in a midstream patch of soil. About one-half mile farther down stream permanent spring from the canyon side showed a temperature of 44°, and moss and watercress were profuse there with quite a quantity of ordinary grass as well. A large spring at the outlet of the canyon about 2,000 feet lower, and about 3 miles farther downstream has a temperature of 48°. The temperature of this spring had been observed by its owner many times, and it is said not to vary even a fraction of a degree from winter to summer. It is said by those acquainted with the upcanyon springs, that their temperature does not appear to vary from season to season, and they are always colder than the spring at a lower elevation.

SNOW SURVEY IN THE WALKER DRAINAGE BASIN, NEVADA.

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On March 19, 1913, the writer, in company with Messrs. Charles Fulton and J. L. Edmiston, began a snow survey of the Walker Drainage Basin. Prof. Church's snow sampler was used and worked excellently. A cutter where the sampler pierces the snow was battered in 11 days work, and was replaced by a new one. The sam-